**Principles of Heredity Revision Name:**

*Part A: Circle the letter of the term or phrase which correctly completes the statement*

1. Which of the following describes the differences in bases present on DNA and RNA:
2. A replaces G B. U replaces T C. M replaces C D. N replaces A
3. A dominant trait or characteristic is one that:
4. Skips a generation C. Prevents another trait from showing
5. Is hidden C. Is only in females
6. The number of chromosomes in a human male sperm cell is:
7. 20 B. 46 C. 13 D. 23
8. Two X chromosomes are found in cells of all:
9. Human males B. Human females C. Fruit flies D. Living things
10. A hybrid or heterozygous organism can be defined as an organism having:
11. Two recessive genes C. Two dominant genes
12. A dominant and a recessive gene D. Three recessive genes
13. The formation of sex cells (sperm and ova) is called:
14. Mitosis B. Breeding C. A Punnett square D. Meiosis
15. In a cross between a pure (homozygous) and a hybrid (heterozygous) yellow-seeded pea plant (i.e. YY with Yy), the percentage of offspring showing the dominant trait or characteristic will be:
16. 100% B. 0% C. 25% D. 75%
17. Human males produce sperm cells with the chromosomes:
18. X only B. Y only C. XX D. X or Y
19. The passing of traits from parents to offspring is called:
20. Blending B. Mutation C. Heredity D. Vigour
21. Which of the following is NOT a characteristic of DNA:
22. It has a helical (spiral) shape C. It is found in the cell walls of all cells
23. It contains sugar, phosphate and bases D. It codes for inherited traits and proteins
24. The term selective breeding refers to:
25. Organisms whose genes have been changed artificially
26. Removing some DNA or genes from an individual, changing it, and putting it back in the same person.
27. A ‘map’ of all the genetic material in humans
28. Purposely breeding organisms that have favourable traits
29. The percentage of offspring with the dominant trait if both parents are pure (homozygous) recessive is:
30. 0% B. 25% C. 50% D. 100%
31. Which of the following statements about autosomal cells is NOT true:
32. The chromosome number is haploid
33. The nucleus contains 46 chromosomes
34. They reproduce by mitosis
35. Cell reproduction produces identical cells

*Part B*

Use the word homozygous/pure or heterozygous/hybrid to identify each of the following genotypes.

1. HH: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. hh: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3. Hh: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Use the code R for recessive and D for dominant to identify which trait will be shown in individuals with the following phenotypes:

4. GG: \_\_\_\_\_\_ 5. gg: \_\_\_\_\_\_ 6. G \_: \_\_\_\_\_\_ 7. Gg: \_\_\_\_\_\_

A black guinea pig is mated with a black guinea pig. Fifteen black and five white offspring are produced.

8. Were the parent guinea pigs homozygous or heterozygous? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. Were the white offspring homozygous or heterozygous? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. How many of the offspring were probably hybrid? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A black guinea pig is mated with a white guinea pig. All offspring (42) were black.

11. Which trait is dominant, black or white? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. Which trait is recessive, black or white? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13. Are the offspring homozygous or heterozygous? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14. Was the black parent homozygous or heterozygous? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Part C*

The pedigree shown is for albinism. Shaded symbols represent persons who are albinos.

B

A

E

D

C

Circle the correct underlined word or phrase to complete each statement.

1. Person A is male/female 2. Person A is normal/albino

3. Person B is male/female 4. Person B is normal/albino

5. Persons C and D are children/parents of person A and B

6. Person A has a genotype NN/Nn/nn 7. Person B has a genotype NN/Nn/nn

8. Person C has a genotype NN/Nn/nn 9. Person D has a genotype NN/Nn/nn

*Part D*

1. Let the allele for tallness in pea plants be represented by T and the allele for shortness be represented by t. Using Punnett squares, solve the following problems:

1. If you cross a Tt plant with a tt plant, what are the probable offspring? Complete the Punnett square and write the number of appropriate offspring in the blanks to the left.

|  |  |  |
| --- | --- | --- |
|  | T | t |
| t |  |  |
| t |  |  |

No. of tall plants produced: \_\_\_\_\_\_\_\_\_

No. of short plants produced: \_\_\_\_\_\_\_\_\_

No. of homozygous tall produced: \_\_\_\_\_\_\_\_\_

No. of heterozygous tall produced: \_\_\_\_\_\_\_\_\_

No. of homozygous short produced: \_\_\_\_\_\_\_\_\_

1. If you cross a TT plant with a Tt plant, what are the probable offspring?

|  |  |  |
| --- | --- | --- |
|  | T | T |
| T |  |  |
| t |  |  |

No. of tall plants produced: \_\_\_\_\_\_\_\_\_

No. of short plants produced: \_\_\_\_\_\_\_\_\_

No. of homozygous tall produced: \_\_\_\_\_\_\_\_\_

No. of heterozygous tall produced: \_\_\_\_\_\_\_\_\_

No. of homozygous short produced: \_\_\_\_\_\_\_\_\_

2a. Explain the process of therapeutic cloning: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2b. Provide the results of the human genome project: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Answers:** *Part A:* 1B, 2C, 3D, 4B, 5B, 6D, 7A, 8D, 9C, 10C, 11D, 12A, 13A. *Part B:* 1. Homozygous 2. Homozygous 3. Heterozygous 4. Dominant 5. Recessive 6. Dominant 7. Dominant 8. Heterozygous 9. Homozygous 10. Half 11. Black 12. White 13. Heterozygous 14. Homozygous *Part C:* 1. Male 2. Normal 3. Female 4. Albino 5. Children 6. Nn 7. nn 8. Nn 9. nn *Part D:* 1a. 2, 2, 0,2, 2 1b. 4, 0, 2, 2, 0 2a. Take DNA from healthy cell & transfer to egg -> allow 5 days to grow into blastocyst -> collect stem cells in growth media -> transplant 2b. All people have 99% same DNA, 6% usefulDNA, 32000 genes coding for approx. 26000 proteins of which not all functions are known yet!